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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P1799PC	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2004/001486	International filing date (day/month/year) 15.10.2004	Priority date (day/month/year) 21.10.2003
International Patent Classification (IPC) or national classification and IPC D21F 3/02		
Applicant Metso Paper Karlstad AB et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.	
2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.	
3. This report is also accompanied by ANNEXES, comprising:	
a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>10</u> sheets, as follows:	
<input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).	
<input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.	
b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).	
4. This report contains indications relating to the following items:	
<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

Date of submission of the demand 13.05.2005	Date of completion of this report 26.10.2005
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Form PCT/IPEA/409 (cover sheet) (April 2005)

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/001486

Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☐ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1 - 18 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* 31 - 40 as amended (together with any statement) under Article 19
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1 - 7 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/001486

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-33</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-33</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-33</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Document cited in the International Search Report:
D1: DE 3030233

The cited document represents the general state of the art.
The invention defined in claims 1- 33 is not disclosed by this document.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed support body made of at least two layers of elastic material, for an apparatus having an extending nip. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1- 33 is novel and is considered to involve an inventive step. The invention is industrially applicable.

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C L A I M S

1. A support body (7) for an apparatus having an extended nip (N) being defined by a contact surface (13) of the support body (7) and an opposed surface (4), said support body (7)

- has two side surfaces (69, 70) facing from each other and connecting to said contact surface (13), and a bottom surface (71) facing from the contact surface (13),

- is arranged to be moved in the direction towards the opposite surface (4) by means of a loading system in order to load the nip (N) via said contact surface (13), and

- is elastically deformable and has its contact surface (13) adaptable to the opposed surface (4) in interaction therewith,

characterized in that the support body (7) is made of at least two layers (53) of elastic material, said layers being joined to a unit.

2. The support body (7) according to claim 1, **characterized in** that each of said layers forms a contact zone of the contact surface (13) and has different elasticities.

3. The support body (7) according to claim 2, **characterized in** that it is made of rubber or polymer with good elasticity and good strength.

4. The support body (7) according to claim 3, **characterized in** that the polymer is polyurethane.

5. The support body (7) according to any one of claims 1-4, **characterized in** that the support body (7) is

adapted to operate at a load in the nip (N) which varies from 0 to 3000 kN/m.

5 6. The support body (7) according to any one of claims 1-5, **characterized in** that it has a dimension in the machine direction of 50-500 mm.

10 7. A support device for an apparatus having an extended nip (N), comprising a support body (7) as defined in any one of claims 1-6, and a holding device (8) for the support body (7) arranged to form a counterstay for said two side surfaces (69, 70) of the support body (7) and directly or indirectly form a counterstay for said bottom surface (71) of the support body (7), and that the
15 support body (7) has a top portion (31) which has said contact surface (13) and being arranged to protrude from the holding device at least in the nip-forming operation position of the support body.

20 8. The support device according to claim 7, **characterized in** that the holding device (8) has a space (16) for receiving the support body (7), said space (16) having two side surfaces (66, 67) for interaction with the opposite side surfaces (69 and 70, respectively) of
25 the support body (7), and a bottom surface (68) facing to the bottom surface (71) of the support body (7).

30 9. The support device according to claim 8, **characterized in** that said top portion (31) is arranged to protrude from the holding device (8), that said bottom surfaces (71, 68) of the support body (7) and holding device (8) are in direct contact with each other, and that the loading system comprises a power transmitting device (50) arranged to move the holding device (8).

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together with the support body (7) in order to load the nip (N).

10. The support device according to claim 9,
5 **characterized in** that the power transmitting device (50) includes hydraulic cylinders, pneumatic cylinders, jacks or similar.

11. The support device according to claim 8,
10 **characterized in** that the bottom surface (71) of the support body (7) is located at a distance from the bottom surface (68) of the holding device (8) to define an enclosed chamber (57) therebetween, and that the loading system comprises a power transmitting device including a
15 pressure chamber formed by said enclosed chamber (57) and being arranged to be pressurized in order to move the support body (7) in relation to the holding device (8) in order to load the nip (N) while the support body being elastically deformed.

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12. The support device according to claim 8,
characterized in that the bottom surface (71) of the support body (7) is located at a distance from the bottom surface (68) of the holding device (8) to define an
25 enclosed chamber (57) therebetween, that the loading system comprises a first power transmitting device (50) arranged to move the holding device (8) together with the support body (7) from a first starting position with the contact surface (13) of the support body (7) at a
30 distance from the opposite surface (4) to a second starting position with the contact surface (13) of the support body (7) located adjacent or close to the opposite surface (4), and a second power transmitting
device (52) comprising a pressure chamber formed by said
35 enclosed chamber (57) and being arranged to be

pressurized with an increased pressure in order to move the support body (7) in relation to the holding device (8) to load the nip (N) while the support body being elastically deformed to form a nip-forming operation position.

13. A holding device (8) for a support body (7) as defined in any one of claims 1-6, wherein the holding device (8) is arranged to form a counterstay for said two side surfaces (69, 70) of the support body (7) and directly or indirectly form a counterstay for said bottom surface (71) of the support body (7), and that the support body (7) has a top portion (31) which has said contact surface (13) and being arranged to protrude from the holding device at least in the nip-forming operation position of the support body (7).

14. The holding device according to claim 13, **characterized in** that it has a space (16) for receiving the support body (7), said space (16) having two side surfaces (66, 67) for interaction with the opposite side surfaces (69 and 70, respectively) of the support body (7), and a bottom surface (68) facing to the bottom surface (71) of the support body (7).

15. The holding device according to claim 13 or 14, **characterized in** that said top portion (31) is arranged to protrude from the holding device (8), that said bottom surfaces (71, 68) of the support body (7) and holding device (8) are in direct contact with each other, and that the loading system comprises a power transmitting device (50) arranged to move the holding device (8) together with the support body (7) in order to load the nip (N).

16. The holding device according to claim 15, characterized in that the power transmitting device includes hydraulic cylinders, pneumatic cylinders, jacks or similar.

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17. The holding device according to any one of claims 14-16, characterized in that the bottom surface (71) of the support body (7) is located at a distance from the bottom surface (68) of the holding device (8) to define an enclosed chamber (57) therebetween, and that the loading system comprises a power transmitting device including a pressure chamber formed by said enclosed chamber (57) and being arranged to be pressurized in order to move the support body (7) in relation to the holding device in order to load the nip (N) while the support body (7) being elastically deformed.

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18. The holding device according to any one of claims 14-17, characterized in that the bottom surface (71) of the support body (7) is located at a distance from the bottom surface (68) of the holding device to define an enclosed chamber (57) therebetween, that the loading system comprises a first power transmitting device (50) arranged to move the holding device (8) together with the support body (7) from a first starting position with the contact surface (13) of the support body (7) at a distance from the opposite surface (4) to a second starting position with the contact surface (13) of the support body (7) located adjacent or close to the opposite surface (4), and a second power transmitting device (52) comprising a pressure chamber formed by said enclosed chamber (57) and being arranged to be pressurized with an increased pressure in order to move the support body (7) in relation to the holding device (8) to load the nip (N) while the support body being

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elastically deformed to form a nip-forming operation position.

19. An apparatus for the treatment of a fibre web (W) that is manufactured in a paper or board machine, comprising a first structural element (1) and a second structural element (2) which is movably arranged and having an opposite surface (4) for interaction with the first structural element (1) while forming an extended nip (N), said first structural element (1) comprising a movable clothing (6) and a support device comprising a support body (7) having a contact surface (13) which defines said nip (N) together with the opposite surface (4), said support body (7)

- has two side surfaces (69, 70) facing from each other and connecting to said contact surface (13), and a bottom surface (71) facing from the contact surface (13),
- is arranged to be moved in the direction towards the opposite surface (4) by means of a loading system in order to load the nip (N) via said contact surface (13), and
- is elastically deformable and has its contact surface (13) adaptable to the opposed surface (4) in interaction therewith,

characterized in that the support body (7) is made of at least two layers (53) of elastic material, said layers being joined to a unit.

20. The apparatus according to claim 19, **characterized in** that said support device also comprises a holding device (8) for the support body (7) arranged to form a counterstay for said two side surfaces (69, 70) of the support body (7) and directly or indirectly form a counterstay for said bottom surface (71) of the support

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body (7), and that the support body (7) has a top portion (31) which has said contact surface (13) and being arranged to protrude from the holding device at least in the nip-forming operation position of the support body.

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21. The apparatus according to claim 19, wherein the support body (7) further is designed according to any one of claims 2-6.

10 22. The apparatus according to claim 20, wherein the holding device (8) further is designed according to any one of claims 13-18.

15 23. The apparatus according to any one of claims 19-22, characterized in that also the second structural element (2) comprises a support body that has a contact surface forming said opposite surface (4), wherein both support bodies are designed according to any one of claims 1-6.

20 24. A press for the treatment of a fibre web (W) that is manufactured in a paper or board machine, comprising a first press element (1) and a second press element (2) which is movably arranged and having an opposite surface (4) for interaction with the first press element (1) while forming an extended press nip (N), said first press
25 element (1) comprising a movable belt (6) and a press device which comprises a press body (7) having a press surface (13) which defines said nip (N) together with the opposite surface (4), said press body (7)

30 - has two side surfaces (69, 70) facing from each other and connecting to said press surface (13), and a bottom surface (71) facing from the press surface (13),

35 - is arranged to be moved in the direction towards the opposite surface (4) by means of a loading system in

order to load the nip (N) via said press surface (13),
and

- is elastically deformable and has its press surface (13) adaptable to the opposed surface (4) in

5 interaction therewith,

characterized in that the support body (7) is made of at least two layers (53) of elastic material, said layers being joined to a unit.

10 25. The press according to claim 24, **characterized in** that the press device also comprises a holding device (8) for the support body (7) arranged to form a counterstay for said two side surfaces (69, 70) of the press body (7) and directly or indirectly form a counterstay for said
15 bottom surface (71) of the press body (7), and that the press body (7) has a top portion (31) which has said press surface (13) and being arranged to protrude from the holding device at least in the nip-forming operation position of the press body.

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26. The press according to claim 24 or 25, **characterized in** that the opposite surface (4) and/or the press surface (13) are/is arranged to be heated.

25 27. The press according to any one of claims 24-26, wherein the press body (7) is designed according to any one of claims 1-6.

28. The press according to any one of claims 24-27,
30 **characterized in** that also the second press element (2) comprises a press body that has a press surface forming said opposite surface (4), wherein both press bodies are designed according to any one of claims 1-6.

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29. A method of forming an extended nip (N) in an apparatus that comprises a support body (7) designed according to any one of claims 1-6, wherein the method comprises the steps of:

- 5 - mounting the support body (7) in a holding device (8) designed according to any one of claims 13-18;
- loading the support body (7) by means of the loading system; and
- 10 - displacing the contact surface (13) of the support body (7) in the direction towards the opposite surface (4) under the influence of said loading in order to elastically deform the contact surface (13) and adaptation to the opposite surface (4).

15 30. A method of controlling the load in an extended nip (N) in an apparatus that comprises a support body (7) designed according to any one of claims 1-6, wherein the method comprises the steps of:

- 20 - designing the support body (7) of at least two layers of elastic material having different elasticity;
- mounting the support body (7) in a holding device (8) designed according to any one of claims 13-18;
- loading the support body (7) by means of the loading system; and
- 25 - displacing the contact surface (13) of the support body (7) in the direction towards the opposite surface (4) under the influence of said loading in order to elastically deform the contact surface (13) and adaptation to the opposite surface (4) in order to
- 30 obtain an extended nip (N) having a load profile in dependence of different elasticities of the layers.

31. The use of a support body (7) according to any one of claims 1-6 as a press body (7) in a press apparatus in
35 a paper or board machine.

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32. The use of a support body (7) according to any one of claims 1-6 as a supporting foil for a carrying apparatus in a paper or board machine.

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33. The use of a support body (7) according to any one of claims 1-6 as a reeling support in a reel-up of a paper or board machine.

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